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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,986	09/05/2003	Sudipta Seal	UCF-374	1954

23717 7590 11/03/2006

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COCOA, FL 32922

EXAMINER
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MILLER, DANIEL H

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/655,986

Applicant(s)

SEAL ET AL.

Examiner

Daniel Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8 Aug. 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 and 21-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 21 and 23-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 4-5, 25-27, 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Atita (U.S. 5,472,795).
3. Atita teaches a nanolaminate of zirconium oxide containing a thin layer of polycrystalline metastable tetragonal zirconia deposited on a support (substrate) (abstract). The average crystal (particle) dimension is preferably less than 13 nm (column 3 line 67-68; column 4 line 1) and would inherently be spherical (See Montino (U.S. 5,002,909), which teaches spherical particles of mixed oxides of alumina and zirconia, stabilized at room temperature in a crystalline tetragonal phase. The particles consisting essentially of non-agglomerates particles (monodispersed), and having a particle size from .1 to 1 micrometer (for evidentiary purposes; column 3 line 15-20, 25-30, 55-60). Monodispersed Tetragonal phase particles of zirconium oxide are inherently spherical regardless of their production method being a sol-gel method.
4. Atita further teaches that the zirconia can be 100% tetragonal zirconia (column 10 line 5-30) substantially free of stabilizing dopant (oxides) (column 6 line 33-35).

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Regarding claims 29-30, the monodispersed particles are interpreted to have constituted a powder pre-lamination.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 3, 4-5, 6, 25-27, 28, 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atita (U.S. 5,472,795) in view Montino (U.S. 5,002,909).

7. Atita teaches a nanolaminate of zirconium oxide containing a thin layer of polycrystalline metastable tetragonal zirconia deposited on a support (substrate) (abstract). The average crystal (particle) dimension is preferably less than 13 nm (column 3 line 67-68; column 4 line 1).

8. Montino (U.S. 5,002,909), teaches spherical particles of mixed oxides of alumina and zirconia, stabilized at room temperature in a crystalline tetragonal phase. The particles consisting essentially of non-agglomerates particles (monodispersed), and having a particle size from .1 to 1 micrometer (column 3 line 15-20, 25-30, 55-60).

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9. Regarding claim 6, Atita further teaches that the zirconia can be 100% tetragonal zirconia (column 10 line 5-30) substantially free of stabilizing dopant (oxides) (column 6 line 33-35).

10. Regarding claims 29-30, the monodispersed particles are interpreted to have constituted a powder pre-lamination.

11. It is noted that the process by which a product is obtained is not indicative of the patentability of a claim to the product wherein the product is otherwise taught.

12. Regarding claims 3 and 28, it would have been obvious to have the particle size be between 500-600 nm since Montino teaches an overlapping range of particle sizes (see above).

13. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the spherical zirconia particles of Montino (wherein Atita is silent as to shape) for the particles of Atita because both have tetragonal phases, are monodispersed, have similar diameters, and are employed for similar mechanical and thermal advantages for the particles of Atita.

14. Further, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of Montino (a non-sol gel technique) to make the zirconia particles of Atita in order to obtain a spherical particle.

15. Claims 21, 23, 24, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atita (U.S. 5,472,795) in view of Montino (U.S. 5,002,909) further in view of Allen (U.S. 6,652,987).

16. Atita in view of Montino, discussed above, are silent as to the presence of a metal substrate. However Atita does teach that the substrate can be virtually any desired material (column 3 line 22-24), and that the invention provides a tough coating that will adhere to an unheated substrate regardless of its chemical nature (column 3 line 33-35).

17. Allen teaches that it is known in the art to use tetragonal zirconium oxide thermal barrier coatings on metals, in applications such as turbine engines, for reducing radiation heat transfer and reducing metal temperatures and cooling requirements (column 1 line 5-37).

18. Regarding claim 24, it would have been obvious to have the particle size between 500-600 nm since Montino teaches an overlapping range of particle sizes (see above).

19. It would have been obvious to one of ordinary skill in the art at the time of the invention to put the coating of Atita on a metal substrate because the substrate can be virtually any desired material, and that the invention provides a tough coating that will adhere to an unheated substrate regardless of its chemical nature; and it is known to use a tetragonal zirconium oxide thermal barrier coatings metal substrate in applications such as turbine engines, for reducing radiation heat transfer and reducing metal temperatures and cooling requirements.

***Response to Arguments***

20. Applicant's arguments, filed 8/17/2006, with respect to the 103 rejections have been fully considered and are persuasive. The obvious rejection of Leushake (U.S. 6,168,833 B1) in view of Allen (U.S. 6,652,987) has been withdrawn. Applicant's arguments filed 8/17/2006 have been fully considered but they are deemed moot with regards to Atita in view of new grounds of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Miller whose telephone number is (571)272-1534. The examiner can normally be reached on M-F/Th.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571)272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Miller



JENNIFER MCNEIL  
SUPERVISORY PATENT EXAMINER  
10/30/06